

# Observation and Analysis of Smectic Islands in Space (OASIS)



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## Objective:

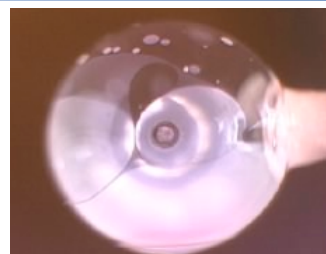
- ◆ To exploit the unique characteristics of freely suspended liquid crystals in a microgravity environment to advance the understanding of fluid state physics.

## Relevance/Impact:

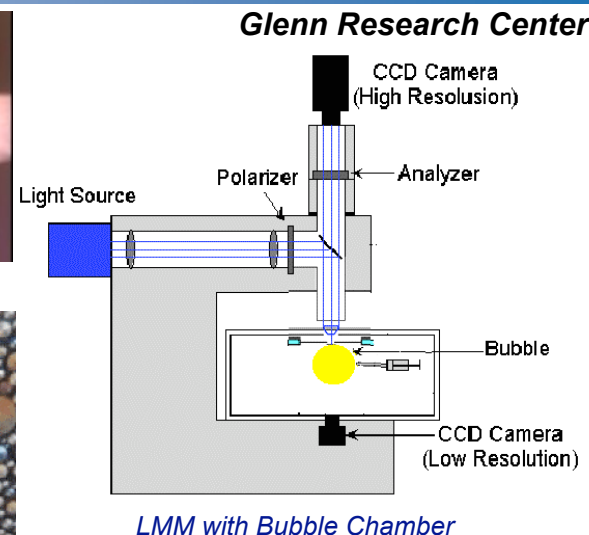
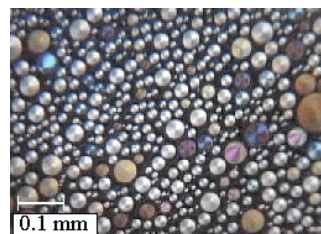
- ◆ Currently an important unsolved problem ferroelectric liquid crystal micro-displays in the space helmets is the annealing of dislocations generated when the smectic layers are formed on the transparent viewing screen of the display unit. The proposed liquid crystal bubble experiments resolve the annealing dislocation problem of smectic ferroelectric liquid crystal micro-displays, one of the key aspects of generating well aligned electro-optic devices. It will improve the contrast, resolution and response time of the liquid crystal display devices that are currently used on the Helmet Mounted and Head Up display systems.

## Development Approach:

- ◆ The OASIS flight instrument is designed to optimize use of the LMM
- ◆ The OASIS/LMM will be designed for autonomous operation through scripts and ground commanding. Crew time is required for initial installation, checking sample loading and bubble/island formation.
- ◆ The OASIS is being designed to utilize the FIR capabilities to the maximum extent possible.



Islands on 1cm bubble



## ISS Resource Requirements

<b>Accommodation (carrier)</b>	Fluids Integrated Rack (FIR)/LMM
<b>Upmass (kg)</b> (w/o packing factor)	10 Kg
<b>Volume (m<sup>3</sup>)</b> (w/o packing factor)	0.09
<b>Power (kw)</b> (peak)	0.5kw for OASIS / LMM 1.1 kw for FIR & OASIS / LMM
<b>Crew Time (hrs)</b> (installation/operations)	5 Hours
<b>Autonomous Operation</b>	2 months
<b>Launch/Increment</b>	2012

## Project Life Cycle Schedule

Milestones	SCR	RDR	PDR	CDR	VRR	Safety	FHA	Launch	Ops	Return	Final Report
<b>Actual/ Baseline</b>	5/2008	9/2009	6/2010	6/2011	6/2011	3/2012	6/2012	2012/13	2012/2013	2013	2014
<b>Documentation</b>	Website: to be developed eRoom: to be developed				SRD: Draft 04/14/2008 EDMP: to be developed			Project Plan: to be developed SEMP: to be developed			